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# SCIENCE NEWS LETTER



®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



**Predesigned**

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A SCIENCE SERVICE PUBLICATION

# Transistorized telephone summons you with a musical tone



Above: Experimental model resembles regular "500" set; the only visible departure is a louver in the base through which the musical tone is radiated.

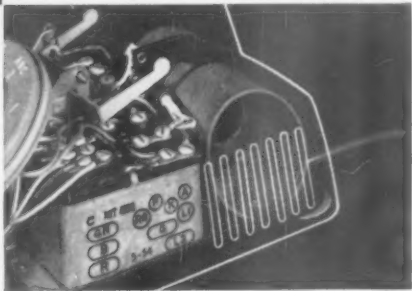
Bell scientists have developed a new musical tone device which may some day replace the telephone bell, if it meets technical standards and customers' approvals.

Because the musical tone equipment uses transistors, the tones will be transmitted with the same amount of power required to transmit a telephone conversation—considerably less than is needed to make a telephone bell ring.

The experimental telephone sets resemble the current "500" sets; the only external difference is a louver at the side of the base through which the tone is radiated by a small loudspeaker mounted inside the telephone's base.

Tests have shown that the musical tone can be heard at great distances. It stands out above general room noise and can be distinguished from sounds like ringing of doorbells or alarm clocks.

This new low-power signaling technique is expected to play an important part in the electronic switching system now under development at Bell Telephone Laboratories.



Above: Bell ringer has been displaced by a small loudspeaker in transistorized telephone. Left: L. A. Meacham heads the team of engineers that developed the musical tone ringer. Mr. Meacham holds a B.S. in Electrical Engineering from the University of Washington, Class of '29. He became affiliated with Bell Labs a year after his graduation. In 1939 Mr. Meacham won the "Outstanding Young Electrical Engineer" award of Eta Kappa Nu.



**BELL TELEPHONE LABORATORIES**

*World center of communications research and development*

## PUBLIC HEALTH

# Leukemia Danger

**X-ray treatment of spondylitis makes leukemia rate ten times normal. Breathing of radioactive particles from fallout could produce lung cancers.**

► **WARNINGS** of a new leukemia danger and of a possible lung cancer danger from radiation appear in the British Medical Research Council's report on the hazards of nuclear radiation.

The report, a companion piece to that issued by the U. S. National Academy of Sciences, is now being studied by atomic scientists and medical men in America.

Inhaling radioactive particles in the fallout from atomic explosions or in the vicinity of nuclear reactors could, theoretically, lead to cancer of the lung, the British report points out.

The radioactive particles would not be uniformly distributed in the lungs but would tend to collect in small areas. These areas would then be subjected to a high dose of radiation "with the result that in the long run lung cancers might be produced in some people."

The British scientists point out, however, that this would be "extremely unlikely" to happen as a result of fallout except in conditions of actual warfare. So long as proper safeguards are used, it is not likely to happen in the vicinity of nuclear reactors.

The new leukemia danger is apparently real rather than theoretical, and one which medical men seem to have overlooked. It threatens patients with the joint disease, ankylosing spondylitis. The stiffening of the joints, particularly in the spine, has earned this condition the popular name, "poker spine."

The disease usually starts in early adult life and is about six times more frequent in men than women.

The leukemia danger comes from the X-ray treatment often given and which helps some spondylitis patients, even permanently halting the disease.

## Ten Times Normal

Spondylitis patients given this treatment developed leukemia at about 10 times the rate that would be expected if they had not had radiation treatment, the scientists report.

This finding was made in a special study of hospital records of between 13,000 and 14,000 patients, all of whom had gotten X-ray treatment for spondylitis at some time during the period 1935 to 1954. Leukemia developed in 38 of these patients. This seems a small number until compared with national death rates for leukemia over the same period. Calculations based on these figures showed the 10 times increased incidence.

No increased amount of leukemia was

found in patients who had not been treated by X-rays.

The X-ray treatment for ankylosing spondylitis is usually given over the whole spine, so that a large part of the body is exposed directly to the radiation. Some patients have had to have more than one course of treatment. The treatment is so extensive that it "more nearly approaches whole body irradiation than that given for any other non-malignant condition." It was for this reason that the British scientists made a special study of it after finding that leukemia had been reported in two patients given X-ray treatment for the condition.

The possibility that patients suffering from this condition are unusually sensitive to X-rays cannot be ruled out, the report points out.

A theoretical possibility also exists that very small doses could be given spondylitis patients without danger of producing leukemia. This could not be told from the available records.

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## CIVIL DEFENSE

## Assume Every U. S. City Can Be Attacked

► **"IT IS ACCEPTED** that the Soviet Union has the capability of striking any target within the United States."

This is the guiding principle these days for all research and planning by the Federal Civil Defense Administration as disclosed in their Fifth Annual Report to the President and the Congress.

Many of the civil defense plans and assumptions remain constant for some years, the FCDA people tell us. Others change.

From reading the report, it appears that if the United States is attacked, it will be with everything but the proverbial kitchen sink.

Spelled out in black and white for this year, these are the assumptions upon which civil defense planning is being made:

### Principal Weapons Bombs

1. If the U.S. is attacked, the principal weapons will be atomic or hydrogen bombs of varying sizes delivered by aircraft or submarine. (There is no mention in the planning assumptions of guided missiles or intercontinental ballistic missiles.)

2. Some of these weapons will be detonated in the air and others at ground level. If detonated at or near the ground, radiological contamination in deadly concentrations will be produced in areas far beyond the zones of blast and thermal damage.

3. Incendiary and chemical warfare weapons will also be used.

4. Sabotage will be employed, involving clandestine use of nuclear, biological and chemical weapons.

5. Psychological warfare will be used in an attempt to disrupt defense programs, impair production, create panic and despair, and weaken our will to fight.

6. The enemy's initial attack will be an attempted knockout blow, to be followed by other attacks of varying intensity, and that a large proportion of the weapons carried will be delivered on target.

*Science News Letter, July 7, 1956*



**ROCKET ENGINE TEST**—Three test firings of rocket engines to power U. S. military missiles. Photograph was made at the Field Propulsion Laboratory of Rocketdyne in California's Santa Susana Mountains. It was made in a series of exposures over a period of nearly four hours, since the engines can be tested only one at a time.

## NUTRITION

# Eating Habits Change

► THE WORLD is changing its eating habits, a Government agricultural expert reports.

Western Europe is consuming more fruit, milk and cheese than before the war; bread is replacing rice in some countries of south-east Asia; and here at home, we are eating less grain products and potatoes and more eggs, green vegetables, citrus fruits and tomatoes.

The change in people's eating habits can not be attributed solely to a change in their tastes and preferences, E. O. Pollock of the U. S. Department of Agriculture foreign agricultural service says.

"Historically," Mr. Pollock points out, "changes in eating habits follow one general trend. At a low income level, people eat mostly cereals, starchy roots and tubers, which are the cheapest source of calories. As their income rises, they consume fewer of these foods and eat more peas and beans, animal products, other vegetables and fruits. This has always been the case and there is little likelihood that this trend will change."

Just how fast the changes take place depends on certain forces. One of these is changed price relationships, a good ex-

ample of which is the use of wheat instead of rice in India, Ceylon, Japan and the Philippines. A shortage of rice caused its price to go up, so people started to buy the cheaper wheat. Similarly in this country, margarine is now consumed at three times the amount it was before the Second World War, while butter consumption is down 50%.

Other factors that force a change in eating habits are the interplay of consumers' income and the prices charged consumers; government action, such as nutritional programs; and the growth of the population, where an increase usually brings a demand for more milk and other protein-rich foods.

All these factors affect one another, Mr. Pollock says. Each or all may result in a permanent change in food habits, although there could be reversals. If meat prices dropped here for instance, the American housewife might buy more meat and less fruit, milk and cheese.

Mr. Pollock states that any variation in the normal food consumption patterns must be watched for by researchers for its "decisive effects on world agricultural production and trade."

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## RADAR

# Radar Cooperation Urged

► THE NEXT step in keeping the atomic peace may be the internationalization of the radar and other warning nets designed to tell when unauthorized airplanes or missiles start crossing frontiers.

The plain fact right now is that the U.S. and Soviet warning nets are in great danger of clashing and getting mixed up with each other.

Scientists in the know have privately been suggesting that it might be effective for both sides to admit this. Rivals might be able to get together and man jointly a consolidated warning line pointed both ways.

To do this, conceivably, would be easier than aerial inspection of each other's territory.

The United Nations would be the logical agency to perform this function that would help maintain the "truce."

The United States has been pushing to completion the so-called DEW Line (Distant Early Warning Line), a 3,000-mile chain of radar stations across the roof of America. The Continental Air Defense Command knows where and when every four-engine plane or larger craft comes near our continent. If it is not identified, alert fighters hover over it and Nike projectiles are pointed at it.

In Europe, too, there are warning lines and air defenses, guarding the United States military installations and those of

our allies.

Behind the Iron Curtain there are doubtless similar neutralizing installations. World peace might be bought more cheaply and more safely with joint operation by the United Nations.

Each side would reserve the right to have also their own air intelligence.

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## EMBRYOLOGY

# Can Tell Sex of Very Young Embryos

► THE SEX of a human embryo can be determined at a very early age, before it has developed to the point where the sex organs have differentiated into ovaries or testes, Dr. T. W. Glenister of Charing Cross Hospital Medical School, London, England, reports (*Nature*, June 16).

Among 13 early embryos suitable for examination he found enough nuclei containing sex chromatin to determine that six had been destined to be females. The youngest of these was a pre-somite, that is, probably less than 17 days old counting from the date of conception, and about one-sixteenth of an inch long.

Sex chromatin cells were also found in an even earlier embryo at the blastocyst stage as it was implanting itself into the

maternal tissues. This embryo might have been a week or so old, dating from conception.

Previously, scientists have reported they could tell before birth whether a baby would be a boy or girl by examination of cells found in the amniotic fluid surrounding the unborn infant in the womb.

Dr. Glenister made his sex determinations on embryos and fetuses in the collection of specimens at the Charing Cross Hospital. More specimens will have to be examined and more experience gained, he says, before the test can be said to be entirely reliable.

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## PUBLIC HEALTH

# Bubonic Plague in U. S.

One death in California resulted from Black Death. Was first case in United States since 1951. Danger lies in infection of rats and wild rodents by infected fleas.

► IN THE MIDDLE AGES bubonic plague, or the Black Death, killed half the population of England, and untold hundreds of thousands more on the European continent.

In California, this same Black Death last month (June) killed one American.

We could have another rampant epidemic of the Black Death if plague infected fleas, believed responsible for the one death, got onto the rats in any large city.

Plague infected rat fleas are found almost constantly in Hawaii. Plague infection in the domestic rat population of the United States mainland, however, has been rare in the past 30 years. So no one really fears a plague epidemic here.

State and Federal health authorities, however, are literally beating the bushes in the southern California area where the latest plague victim is believed to have caught his fatal infection. The man, a retired Navy chief petty officer, Andrew Paul Sakacs Jr., U.T.C., had gone fishing in a stream in Ventura County. Three days later he got sick and developed typical buboes, or swellings of the lymph glands, which give this form of the plague its name, bubonic.

Plague germs were found in the material from these buboes when examined in the State Health Department Laboratory at

Berkeley, Calif.

The patient was taken to the Naval Hospital at Corona, Calif., where he died in spite of antibiotic treatment which now is the best treatment for plague. It is believed the man's age may have been against him, since older persons are less likely to survive plague.

Ground squirrels and other wild rodents in California and other western states have been found infected with plague from time to time. The germs of the disease spread from these rodents to men via fleas. Chief Sakacs is believed to have been bitten by a plague-infected flea on his fishing trip.

If the health teams now scouring the area find evidence of plague infection in the wild rodents, they will carry on rodent extermination by trapping and using cyanide in rodent burrows. Rodents trapped will be combed for fleas and then destroyed and examined. The fleas will be ground up and injected into laboratory animals to see whether they carry the bubonic plague infection.

The California plague case is the first in the United States since 1951, and the first in California since 1947. The last case of human plague in the U. S., in 1951, was in New Mexico. This state also reported two cases in 1950 and that same year

Arizona reported one. In 1949 three cases were reported in New Mexico.

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## MICROSCOPY

## TV Device Takes Live Cell Pictures

► CLEARER, more detailed pictures of living cells in ultraviolet light can now be taken with a new device (*Nature*, June 23).

It is called a flying-spot ultraviolet television microscope and was developed by Drs. P. O'B. Montgomery, F. Roberts and W. Bonner of the University of Texas's Southwestern Medical School, located in Dallas, Tex.

Its advantages, they state, are immediate visual presentation of the image and a great reduction in the amount of ultraviolet light needed to produce the image.

The TV-microscope they developed uses new deep ultraviolet scanning television-like tubes and ultraviolet photomultipliers, devices that amplify light. The picture is photographed by exposing a photographic plate to several successive frames displayed on the tube.

Grants for the research leading to development of the device came from citizens of Dallas, the Damon Runyon Memorial Fund, the Rockefeller Foundation and the Texas Instruments-Geophysical Service, Inc., Foundation.

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## MEDICINE

## Anti-Clotting Defect May Affect Thrombosis

► A NEW TYPE of defect in the blood clotting mechanism may play a part in coronary occlusion, or thrombosis, and in other conditions of thrombosis, it appears from studies by Drs. Henry H. Henstell and Miriam Feinstein of the Cedars of Lebanon Hospital and the University of Southern California, Los Angeles.

The defect consists of production by the body of proteins called globulins that are able to combine with and precipitate prothrombin and accessory factors from blood plasma. This results in two changes: 1. Reduction in clotting factors in the blood, causing hemorrhages; and 2. localized concentrations of prothrombin and accessory factors, causing thrombi, or clots.

Clotting defects, both hemorrhages and thromboses, are known to occur in sicknesses in which abnormalities of plasma globulins are known to exist. In other conditions, such as thrombophlebitis, coronary occlusion and the thrombosis that sometimes follows operations, the cause of the clots, or thrombi, has not been discovered in spite of many years of investigation by many scientists. The Los Angeles researchers think such cases should be reinvestigated in the light of their new theory.

Findings on which the theory is based are reported in *Science* (June 22).

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RESCUE DEVICE—The frogman being rescued in this picture is actually traveling faster than the rescue boat. He is being drawn in by the tensioned cord which works like the released rubber band in a slingshot.

## GENERAL SCIENCE

# Science Kits for Egypt

Students in secondary schools will use kits inspired by THINGS of Science to foster the experimental approach and arouse interest in science and technology.

► EGYPTIAN youth in that nation's secondary schools are concentrating on science and technology as a part of a program of technical development being instituted under the present government.

Physics, chemistry, biology and mathematics have been taught at the high school level by methods that are familiar in England and the United States.

A development underway is the contemplated utilization of experimental kits that will be issued to students in order that they may perform basic experiments without the use of elaborate and costly apparatus.

These kits are now in pilot production by the Ministry of Education and will soon be under test in selected classes. Suggested by the THINGS of Science kits developed and produced by SCIENCE SERVICE, the Egyptian kits will be simplified and integrated into the actual courses of instruction.

It is believed that use of the experimental method that will be fostered by the use of the kits will not only inform and instruct the pupils, but inspire them to think for themselves and undertake projects and tests that they think up for themselves.

The THINGS of Science kits that have been issued monthly to a selected list of American members for the past 15 years have accented the new and the novel. For instance, paper made of glass, the metal titanium, synthetic rubber, new plastics and hundreds of other products and materials have been sent to the THINGS members who now number 15,000.

## Illustrate Fundamentals

The Egyptian kits, on the other hand, will be primarily concerned with fundamental facts that illustrate and reinforce the usual content of the science and mathematics courses. There will be kits on chemical indicators, crystallization, analysis by chromatography, and sugars and starches in the field of chemistry. In biology there are kits on seed germination and sea shells as found in the Nile, the Mediterranean and Red seas. Physics courses will show magnetism by use of a lodestone, static electricity by rubbing an amber prayer bead, current electricity by building a simple battery out of coins and vinegar.

The kits have their instructions written in Arabic. They are called "Al-elm-bainayadika" which means "Science within your hands." The materials contained in them are only those that can not be obtained easily in their homes or stores by students.

The kit on sugar and starches contains only a little packet of lactose and the student is asked to bring ordinary sugar from his dinner table and a piece of sugar cane stalk that can be purchased from a street peddler.

The kit on sugar and starches is the first completely produced in Egypt through cooperation with a committee of chemistry teachers.

Through invitation of the Egyptian Minister of Education, Maj. Kamal el Dine Hussein, and the Secretary General of the Council of Ministers, Dr. I. H. Abdel-Rahman, two Science Service staff members spent two weeks in Cairo adapting the experimental kits to Egyptian conditions. In this a committee of science supervisors, inspectors and teachers, headed by Dr. M. A. Barkouki, cooperated and they are carrying on the development of additional kits to be fitted into the Egyptian courses of study.

## Furnished to Students

The ideal is that eventually every student taking science will use a series of his own science kits issued to him lesson by lesson. Each kit will be expendable, like the daily newspaper, and can be taken home for hobby use. There his parents, brothers and sisters and neighbors will be able to see it and even use it.

While the kits themselves will be effective in the teaching of the courses, the idea and the spirit contained in the experimental approach fostered by the use of the kits is of still greater importance.

A mutual exchange of the rights in the kits produced in Egypt and the United States has been arranged so that the youth of both countries will benefit from the developments achieved in both nations.

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## ORNITHOLOGY

## Birds Do Not Respond To Foreign Bird Calls

► AMERICAN birds do not understand the calls of French birds, even those of the same species, a report to the Second International Congress on Acoustics in Cambridge, Mass., indicated.

French crows, three species of which flock together, learn to react to a wider variety of calls and therefore respond better to the calls of American birds than the American birds do to the French.

This "language difficulty" among birds was revealed when laboratories in France

and the United States exchanged bird recordings and tried them out on their own birds.

Results suggest that birds must learn to understand bird calls just as humans must learn a particular language.

The distress cry of the French jackdaw is, however, strikingly effective in France with all three species of French crows. But this same cry had no observable effect on American crows. Neither had the distress call of the French carrion crow.

A few individual American birds were attracted by the nestling cries of the French rooks, but many more flew toward the speaker when it was playing the assembly call of the American species.

French crows react the same to the American crow assembly call as do the American birds themselves.

Neither the food-finding call nor the alarm call of the American herring gull had any effect on French gulls of the same species, although American gulls are strikingly attracted by the food-finding call and fly away from the danger signal.

The research in France was reported to the meeting by Drs. R.-G. Busnel, J. Giban and Ph. Gramet of the National Institute of Agronomic Research, Jouy-en-Josas, France. Their American colleagues are Drs. Hubert and Mable Frings and Dr. J. Jumber of Pennsylvania State University and the Mount Desert Biological Laboratory, Salisbury Cove, Maine.

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## TECHNOLOGY

## Hydrogen Peroxide Used To Power British Sub

► HYDROGEN PEROXIDE, usually thought of as a bleach for blondes, is being used to power Britain's latest experimental submarine, Explorer.

The underwater craft is thought to be the first stable ocean-going vessel to use peroxide as fuel. In World War II, the Germans used the chemical to launch V-1 missiles, to drive fuel pumps in V-2 rockets and to propel torpedoes. The Germans are also reported to have built five peroxide-powered submarines, but never put them in service because there was no peroxide.

A principal advantage of hydrogen peroxide for submarine propulsion is that no exhaust bubbles reach the surface. The Explorer has a conventional diesel engine and a peroxide propulsion system. When hydrogen peroxide breaks up, it releases heat, which is one source of energy. The resulting free oxygen combines with fuel, such as diesel oil, to produce both steam and carbon dioxide to drive the turbine.

Use of the peroxide is reserved for special bursts of speed in attacking and escaping. The Explorer will carry no armament, and will not take part in operations, but will be used for training anti-submarine forces.

The design team that developed the new submarine was led by Dr. G. H. Forsyth of Vickers Armstrong.

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## BOTANY

# Plants Filter Radiation

Tests with cheesecloth and metal screens suggest how plant fibers may act as screen to take up particles. Must determine whether action is harmful or helpful to man.

► TREES, grass and growing crops extract radioactive particles from the air. But whether this natural filtering process is helpful or harmful to man is not yet known.

Evidence that vegetation collects radioactive particles was found at the Naval Research Laboratory in Washington in tests with cheesecloth and metal screens used to catch radioactive particles. Both the cloth and metal filters did pick up radioactive particles by a simple impact process whereby the radioactive particles in the atmosphere, along with other particles, strike the filter's small fibers and stick.

Scientists now believe that this is the same process occurring in nature, where the fibers of plants pick up radioactivity from the air streams.

This plant filtering process presents scientists with an as yet unsolved paradox.

On the one hand, it is thought by some that any elimination of radiation from the atmosphere, no matter how slight, is beneficial to man. If trees and plants are filtering out radioactive particles, then they are protecting man.

On the other hand, by picking up radioactive particles, grains used to make bread might carry over some of the radioactivity and end up on the dinner table, or by the same token, grass eaten by cows may transfer some of its picked-up radioactive particles to milk that ends up in baby's bottle.

One of the problems faced by scientists in determining whether natural radiation filtering is harmful or helpful is the difficulty in measuring the amount of radioactivity that remains in a plant. The test screens, for example, proved to be only one percent efficient. Just how efficient plants are has to be determined.

The scientists who reported their work with screens in the journal *Science* (June 22), Dr. L. B. Lockhart Jr., I. H. Blifford Jr., and R. A. Baus, state that "natural filters such as grass or trees may behave like many layers of filter fibers in removing activity carried by surface winds. In this case, the removal of particulates is fairly efficient and may account for a large fraction of the fission-product activity deposited on vegetation, particularly in the absence of precipitation."

It has been found that the leaves of many plants are more radioactive than the rest of the plant. Part of this is due to radiostrontium falling with rain onto the leaves. However, the natural filtering process may prove to be another reason why foliage has more radioactivity than other parts of the plant.

In addition to their value in studying plant radioactivity, the screens used by the Navy scientists may be excellent tools for studying radioactivity in the atmosphere. It is thought, too, that they will play an important role in studying air masses.

Resembling weather vanes, the screen filters are being used along the 80th meridian in South America to gain more knowledge of radioactivity and the effectiveness of the screens themselves.

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## TECHNOLOGY

## Rotation Unnecessary For Television Antennas

► THE DAY when television antennas can pick up any station within range without need of rotation is foreseen by two Michigan State University scientists.

Dr. Charles P. Wells, mathematics professor, and Dr. Alfred Leitner, physics pro-

fessor, have found that, at least in theory, antenna pick-up can be altered by feeding power to points other than the center as is now done.

Changing the power feed point should set up reception waves simultaneously in from two to several directions, they have calculated. Possible practical applications of their mathematics are being left to the U. S. Army's Office of Ordnance Research, which supports the project.

The study was initiated because, when the first artificial satellite is launched during the International Geophysical Year that starts July 1, 1957, communication between it and the earth is important. Drs. Wells and Leitner are attempting to solve the mathematical equations governing operation of antennas, about which much is still unknown.

"Rockets or satellites could not use clumsy outside antennas like the television ones that perch on roofs," Dr. Leitner said. "They would slow down travel speed and break off."

The scientists, therefore, investigated the possibilities of cigar-shaped antennas. It would be theoretically possible, they found, to treat the rocket itself as an antenna by applying electrical charges to various parts of the rocket.

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Hobart, Okla., a city of 5,380 population, has never had a traffic death since its incorporation in 1901.



**ANTARCTIC INSTRUMENT**—This looks like an ordinary block of glass, but actually the surface has been cut with minute lines, 15,000 to the inch and each line is exactly 20 millionths of an inch deep. The diffraction grating, produced by Hausch and Lomb Optical Co., will play a key role in France's participation in the International Geophysical Year. It is being examined by S. W. Steensma and David Richardson of B & L.

## PHYSICS

**Calcinator Disposes Of Radioactive Waste**

► A TECHNIQUE of carefully-controlled burning in calcinators, indoor incinerators, has proved effective in disposing of bulky combustible radioactive wastes.

This technique, which may be used by radioisotope clinics and laboratories, has proved effective at the Atomic Energy Project of the University of California at Los Angeles, according to Louis B. Silverman, chief of health physics at the project.

Radioactive wastes, which include animal and vegetable matter, are placed in a gas-fired calcinator. Eight to ten loads of waste may be burned before the calcinator ash drawer is removed.

Ashes are wet down and slurred with five to ten pounds of cement which solidifies and gives added weight, and are placed in a plastic-lined 55-gallon drum. When the drum is full, it is sealed and taken out to sea for "burial."

At the U.C.L.A. Atomic Energy Project, where much experimentation with long-lived isotopes is carried out, this technique has reduced sea burials of 55-gallon drums of waste from 50 or more drums to one a year.

Although more than 99% of the radioactive material remains in the ashes, the calcinator stack is monitored to insure that radioactivity remains within permissible levels. Radioactivity of the calcinator area has not been above the normal background radiation, the scientist says.

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## PHYSICS

**Japan Should Go Atomic Study Indicates**

► JAPAN should go atomic, the National Planning Association urges.

A comprehensive study released by the Association and authored by Michael Sapir and Sam J. Van Hyning suggests that Japan should take immediate steps "toward developing a nuclear power program in order to secure the most economic advantage from the peaceful atom."

The target date 1960 or even earlier for Japanese planners was suggested by H. Christian Sonne, chairman of the board of the Association.

The study draws the following long-term economic conclusions for a Japan that would utilize the atom for peace:

1. Competitive nuclear power could improve its prospectively difficult balance of payments position by relieving some of the burden of increasing imports of conventional fuel for power plants.
2. Low cost nuclear power could materially decrease the power costs of some power-intensive industries and thus improve Japan's position in world markets.
3. Low-cost nuclear power might constitute a substantial stimulus to overall expansion of national output but it is doubtful

that by itself it would have a revolutionary impact on the Japanese economy.

The study shows that the use of nuclear power is especially favorable in Japan because that nation's power costs are higher than the industrialized countries of Western Europe or the U.S.; costs of Japan's current hydroelectric development projects are high; the cost of domestically produced coal is high; Japan's problems of foreign exchange make oil importation prohibitive; and the erratic character of Japan's power supply in the postwar period has been a factor in limiting economic expansion.

The study is entitled, "The Outlook for Nuclear Power in Japan."

Science News Letter, July 7, 1956

## ENTOMOLOGY

**Codling Moth Proving Resistant to DDT**

► THE CODLING MOTH, which annually costs apple growers more than \$30,000,000, is developing resistance to DDT, findings of an entomologist indicate.

Dr. Edward H. Glass of the Geneva Experiment Station, Geneva, N. Y., reported his conclusions after observing a commercial apple orchard in western New York.

The codling moths in this orchard had been well controlled during the first six years of DDT spraying, but during two succeeding seasons the insects survived the control measures.

Although nine DDT cover sprays were used in the orchard, codling moth damage was much above normal for the area, where four or five DDT cover sprays previously had given nearly perfect control.

During the past three years, many reports of codling moth increases have come from apple growers in several parts of the country, but Dr. Glass said most of these increases resulted from good codling moth weather and lack of spraying.

Before DDT was discovered, lead arsenate was the chief spray used on codling moths.

Science News Letter, July 7, 1956

## BIOLOGY

**Naturalist Appointed For Canal Zone Post**

► A RESEARCH ZOOLOGIST of the University of California, Dr. Carl B. Koford, has been appointed resident naturalist of the Smithsonian Institution's Canal Zone Biological Area.

Dr. Koford received the terrestrial ecology award of the American Wildlife Society and was made an elective member of the American Ornithologists' Union for his monograph on the California condor. He has conducted research at the Hastings Natural History Reservation in California and has collected specimens of birds and mammals in Mexico and South America.

Dr. Koford replaces James Zetek, recently retired because of illness.

Science News Letter, July 7, 1956

**IN SCIENCE**

## BIOLOGY

**Antibiotic Works At Surface of Cells**

► CIRCULIN, a member of the polymyxin family of antibiotics, and one of the most deadly natural substances to bacteria causing typhoid fever, cholera and other diseases, exerts its lethal action at the surface structures of living cells.

This is the finding of Purdue University scientists Drs. Henry Koffler, H. C. Reitz, P. A. Tetrault and D. J. Colasito, who have been engaged in the development of circulin for several years. It is believed the first demonstration of the probable cellular site of action of an unaltered antibiotic.

For this research, these workers used cells of a bacterium that can be readily fractionated into cell wall, cytoplasmic membrane, and cytoplasm.

Radioactive circulin, biosynthesized with carbon-14, was fed to the test cells. After an incubation period during which 99.9% of the cells were killed by the antibiotic, they were separated into their component parts. Checking the location of the radioactivity, the Purdue researchers found all of it concentrated in the cells' surface structures, while none of it showed up in the cytoplasm.

Science News Letter, July 7, 1956

## ENGINEERING

**Summer Atomic College For Engineering Profs**

► AN ATOMIC college for 60 of the nation's engineering professors is under way at the Argonne National Laboratory, Lemont, Ill. It will pave the way for the teachers to set up nuclear engineering courses in their colleges this fall.

The eight-week summer school is known as the American Society for Engineering Education Nuclear Energy Institute. At the school, the college professors will receive:

1. A survey of the available sources of unclassified information in the atomic energy field and of laboratory teaching methods particularly relevant to the field of nuclear power.
2. Some feeling of the interrelations of the many scientific and engineering disciplines involved in the successful design of a nuclear power enterprise.
3. A more detailed knowledge of some one part of the whole field.

The summer Institute is being jointly sponsored by the American Society for Engineering Education, the National Science Foundation, the Atomic Energy Commission and Northwestern University.

Science News Letter, July 7, 1956



# THE FIELDS

## ENTOMOLOGY

### Beetle Puts Bite On Florida Bugs

➤ A LADY BEETLE from India is going to put the bite on American insect pests in Florida.

The beetle, known scientifically as *Chilomenes*, has a voracious appetite for numerous pests that attack Florida's fruits and vegetables. It particularly likes cotton aphids.

A single lady beetle studied in an Indian laboratory devoured 16,321 aphids in six weeks.

*Chilomenes* has a life span of only just over seven weeks, but it reproduces rapidly. Experiments carried out by Allen G. Selhime at the U. S. Department of Agriculture Insect Field Station in Orlando, Fla., have shown that a few beetles can build to many in a short time. From only 50 beetles, Mr. Selhime developed a brood of 1,000 adults that he released last winter in Florida orchards.

Orange and tangerine groves not under chemical spray treatment are considered best fields of attack for lady beetles, giving them the best chance for survival as well as a maximum opportunity to demonstrate their powers.

Also released in Florida recently was *Brumus*, an Indian lady beetle with an appetite for aphids, psyllids, whiteflies, mites, small scale insects and mealy bugs.

Science News Letter, July 7, 1956

## GENERAL SCIENCE

### Part-Time Science Training Is Urged

➤ YOUNG SCIENTISTS entering laboratories doing Government research would be allowed to go back to school part-time for graduate training at Government expense, if a proposal made by Dr. Clifford Furnas, assistant secretary of the Department of Defense, to the National Committee for the Development of Scientists and Engineers meeting at West Orange, N. J., is adopted.

Speaking personally, Dr. Furnas, who is chancellor of the University of Buffalo, suggested that the cost of graduate work should be an allowable item of cost on a Government contract for research by industry.

This procedure, if adopted, would be an immediate aid to alleviating the current shortage of scientists and engineers because it would upgrade the people who have only a bachelor's degree, and in two to five years give the nation a crop of Ph.D.'s which it would not otherwise have.

Higher overhead on Government grants for research was urged by Dr. Furnas. These should run about 100% the cost of

the work, instead of the top present figure of 48% now allowed on some contracts by the Navy. Some contracts, such as those granted by the U. S. Public Health Service, carry only an eight to 15% overhead.

Dr. Furnas claimed that every time a university does a research job for the Government, the university loses money and it has to pay for it by forcing students to pay higher fees and by its professors accepting smaller salaries.

Science News Letter, July 7, 1956

## AERONAUTICS

### Foresee Ramprops for Straight-Rising Planes

➤ THE RAMPROP, a jet-driven propeller turning at supersonic speeds, could give planes that take off or land vertically the speed and load-carrying capacity of modern aircraft, a scientist foresees.

Albert Gail, research engineer at Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y., reports the ramprop performs better than the turbojet, the turboprop or the turboprop as a power plant for vertically rising and descending aircraft. It can also attain high speed in level flight.

He told a joint meeting of the American Society of Mechanical Engineers and the American Rocket Society in Cleveland that ramprops have been studied at Cornell Lab for six years, some of the research being sponsored by the Office of Naval Research. The ramprop is a propulsion system consisting of rotor blades driven with supersonic speed by ramjets or ramrockets at the blade tips.

The Cornell Lab scientists found that ramprops are most suitable for heavy vertical take-off and landing craft, or V.T.O.L.'s, because large diameter propellers present fewer structural limitations.

Mr. Gail recommended full-scale development of ramprops on a whirling test stand first, then later in actual flight rather than in wind tunnels.

Science News Letter, July 7, 1956

## HOME ECONOMICS

### Prefer Light Bread To Kind Grandma Made

➤ PEOPLE LIKE LIGHT, fluffy bread better than the dense, heavy kind, a survey by the U. S. Department of Agriculture of consumers in Rockford, Ill., has revealed.

The consumers tried five different kinds of white bread. They liked the loaves weighing an ounce for every ten cubic inches better than the ones weighing an ounce for only seven cubic inches.

Their results may disillusion persons who cry nostalgically for "the bread Grandma baked." Department of Agriculture scientists say Grandma's bread was usually heavier than modern varieties, but that Grandma used many different recipes, so maybe her bread really was just as good as is thought.

Science News Letter, July 7, 1956

## TECHNOLOGY

### More Automation Will Step Up Oil Production

➤ MORE OIL can be produced at lower cost if refineries will use more automatic, or feedback, control principles, Albert F. Sperry of Panellit, Inc., Skokie, Ill., told the American Petroleum Institute's division of refining at its meeting in Montreal, Canada.

Feedback control is operation of machines by a device that can receive information from the machines and "know" when to change operating procedure. A good example is a furnace thermostat, which "knows" when to turn the furnace on and off.

Although petroleum production is more highly automatized today than any other industry, very little feedback exists in most refineries except at the lowest levels of operation.

The biggest barrier to effective feedback control at the operator, technical staff and management levels is the time needed to process large amounts of data for effective feedback use. This can be overcome, Mr. Sperry said, by increased use of computers and improved data processing techniques.

Mr. Sperry called feedback control a "more sophisticated" aspect of automation than the complete mechanization the term usually implies.

Science News Letter, July 7, 1956

## MEDICINE

### Find Test Predicts Leukemia Relapse

➤ A TEST to predict when a leukemia patient is going to have a relapse seems to be coming from studies by Dr. Avery A. Sandberg of Roswell Park Memorial Institute, Buffalo, N. Y.

If the relapse can be forecast well in advance, treatment can be started before the usual signs of relapse appear. If the treatment is effective, even temporarily, the patient would be spared days or weeks of sickness.

The test depends on changes in kidney excretion of an enzyme that breaks down one kind of nucleic acid, called DNA, short for deoxyribose nucleic acid. The enzyme is called DNase I. Normal persons have much DNase I activity, but little if any activity of another enzyme, DNase II, which also acts on deoxyribose nucleic acid.

Leukemia patients often have more DNase II activity than DNase I. Before a leukemia patient goes into relapse, there may be a change in urinary excretion of DNase I, Dr. Sandberg finds.

This might give a test for predicting the coming of a relapse.

Dr. Sandberg's findings were announced by the American Cancer Society, which supported his research.

Science News Letter, July 7, 1956

## PHYSICS

# Strange Electrical Genius

This year the world celebrates the centenary of the birth of Nikola Tesla. He was one of the pioneers who laid the foundations of our electrical age.

By WATSON DAVIS

► A HUNDRED YEARS ago on July 10 there was born in the little town of Smiljan, then in Austro-Hungary, one who was destined to become a strange electrical genius, destined to give the world the kind of electrical distribution system that it now uses.

This individual was Nikola Tesla, who did his work in the last decade and a half of the nineteenth century. Dying at the age of 86, he lived over four decades of the twentieth century.

Upon successive birthdays, there were celebrations at which the great inventor was given decorations from Yugoslavia and Czechoslovakia, the region of his origin, and received greetings from friends and associates.

Although Tesla did not do his work primarily in Europe, whence he came at the age of 28, the major centenary celebration this year is in Belgrade to which the Tesla relics and mementos were taken by the Yugoslav ambassador, who was his uncle, at the time of his death.



**NIKOLA TESLA** — The strange genius assumed this mysterious pose when he sat for a portrait in the early days of this century after he had made his great contributions. He holds a gaseous tube glowing by induction.

Later in America the American Institute of Electrical Engineers holds a commemorative session Oct. 1 to 5 in Chicago.

Tesla was indeed a strange genius. The authoritative technical journal *Power*, in assaying his influence on the electrical industry, suggests that if men in the industry were asked to name those who laid the foundation of today's electrical generation and distribution, they would produce an impressive list—Edison, Bush, Thomson, Westinghouse and many others. But, almost surely, the journal commented, Tesla's name would be a significant omission.

Yet Tesla conceived the polyphase alternating current motor which is still basic to the electrical industry. He devised a suitable system of generation and distribution for applying it.

The old-timers and the historians recall the "battle of the systems" which occurred in the 1880's.

## Pioneering Paper

In 1882 Edison's Pearl Street (New York) generating system opened, operating on direct current. There were lamps and motors. But, there were advantages in alternating current distribution. But the big difficulty was there was no successful alternating current motor. In May, 1888, Tesla, but four years in the United States, read a paper before the American Institute of Electrical Engineers. He described a new alternating current system. Its heart was the induction motor with its basic and beautiful concept of the rotating magnetic field.

As the journal *Power* tells the story:

"With characteristic vision, George Westinghouse realized the fundamental importance of the polyphase alternating current system and acquired the basic patents. Its first impact on the general public was at the Chicago World's Fair of 1893. There a 2-phase generator supplied motors and lamps, and, through rotary converters and motor-generators, a variety of direct current equipment.

"But it remained for the Niagara Falls power project to demonstrate in the most dramatic way possible that the polyphase alternating current was the system of the future. Since 1886 when a charter to develop its power had been granted, the eyes of the world had been on Niagara. An international commission, headed by Lord Kelvin, had reviewed 17 proposals, found none acceptable. Later, just five years after Tesla's AIEE paper, it was officially decided to use the polyphase system.

"In August, 1895, Niagara power was delivered to the first industrial customer and in 1896 alternating current transmission to Buffalo, 22 miles away, was begun. By that time, the steam turbine had been introduced in America and the modern age of electric power had truly opened.

"For Nikola Tesla, these far-reaching inventions were but a beginning. Still to come was brilliant work in high frequencies, thinking basic to much of today's radio art."

Tesla's high frequency generators for producing continuous waves, such as his Tesla coil, are used in one form or another in every radio and television set today. He even demonstrated in 1898 boats, cars and other moving objects which could be controlled and maneuvered completely by radio waves. In the early 1890's Tesla described heating bars of iron and melting lead and tin in the field of specially designed high frequency coils. This was high frequency induction heating. His experiments also were pioneering examples of what later became practical high frequency diathermy.

In the 1893 World's Fair he showed wirelessly-lit vacuum and gas-filled tubes. He produced artificial lightning before the turn of the century. The idea of using synchronous clocks for keeping time, powered and kept in step by a single master generator, was conceived by him in 1900. Facsimile, radar and broadcasting were visualized by Tesla in principle.

Tesla was a "lone wolf" inventor who did not link up with the established industries, which his brilliance had done so much to create. He followed new ideas and new challenges, in some cases losing his laboratories and inventions through financial difficulties.

## Communication With Planets

When he lived beyond the three score and ten of tradition, he dreamed of continued achievements, many of which his contemporaries considered impossible. When 81, he predicted that interplanetary communication would become a reality in the immediate future. Upon the same occasion in 1937 he predicted "cheap radium." This was not so far-fetched a prediction when it is considered that in the atomic energy program the radiation-producing equivalent of radium, cobalt 60, is now relatively cheap. But not all his inspirations were so predictive. Earlier, at the age of 78, he claimed a new invention which would, through a "death-beam," destroy 10,000 planes 250 miles away.

In his latter years Tesla's projects became, as the *Power* article explains, "more grandiose, his ways more mysterious, his pronouncements more Olympian."

Great pioneering inventors tend to fade into history.

## • RADIO

Saturday, July 14, 1956, 1:45-2:00 p.m. EDT  
"Adventures in Science" with Watson Davis,  
Director of Science Service, over the CBS Radio  
Network. Check your local CBS station.

Mr. Robert Fairthorne, senior principal scientific officer, Royal Aircraft Establishment in Great Britain, will discuss "Machines and Mathematics."

In the case of Tesla, his name is likely to be used longer than many others. This is due to the fact that the building of a Tesla Coil for the purpose of producing spectacular electrical discharges will continue to be a favorite science fair project for many of the thousands of boys and girls who find scientific experiments so much fun as they learn to become new generations of scientists.

Science News Letter, July 7, 1956

## MEDICINE

### Drug Fails to Bring Expected Improvement

▶ HOPE THAT ISONIAZID, widely used and effective drug in treating tuberculosis, would help patients with another disease, multiple sclerosis, is destroyed by a report to the American Neurological Association meeting in Atlantic City.

The report, based on a study of 186 patients in 11 Veterans Administration Hospitals, was given by Dr. Benedict Nagler, chief of VA's neurology service and chairman of the VA cooperative study.

Science News Letter, July 7, 1956

## BOTANY

### Chemical Probes Plant Senses

▶ PLANTS can be fooled into not knowing which way is up.

A recently discovered chemical keeps plants from responding to gravity by checking their perception mechanisms.

Called N-1-naphthylphthalamic acid, the anti-gravity chemical gives science a new tool to study whatever sensory devices seedlings may have.

Michigan State University scientists working with U. S. Department of Agriculture researchers have discovered that the compound prevents perception of gravity in plants. It does this, the investigators say, by checking growth changes normally caused by gravity.

French scientists first showed that plant seedlings treated with the acid failed to respond to gravity.

Researchers suspected the compound inhibited growth, thereby making the seedlings indifferent to gravity. The United States scientists, Drs. Te May Ching and Robert S. Bandurski of Michigan State University, and Dr. Robert H. Hamilton Jr. of the Department of Agriculture, showed this was not the case.

Science News Letter, July 7, 1956

## METALLURGY

# New Super Alloy

### See Front Cover

▶ A "MADE-TO-ORDER" super-alloy that represents a major step forward in metallurgy was shown in New York by its developers, scientists of the Westinghouse Research Laboratories, Pittsburgh, Pa.

The alloy, called Nivco, was hailed by the scientists as the forerunner of a new class of metals that can be "tailor-made" to do a specific job.

Important as is the alloy itself, the research technique used to develop the alloy is perhaps more important, the Westinghouse researchers hinted. The process permits the "predesign" of a needed set of properties into an alloy before it is ever prepared, thereby eliminating the time- and money-consuming "cut-and-try" metallurgical methods now being used, Dr. Clarence Zener, acting director of Westinghouse research, said.

The new material, which is five times stronger than 12% chrome steel, resists breakdown when subjected to temperatures

as high as 1,200 degrees Fahrenheit and mechanical vibration.

Although the exact ingredients of the new alloy were not disclosed, Dr. A. W. Cochardt, advisory metallurgist at the research center, said it contained principally cobalt and nickel and smaller amounts of five additional elements.

An immediate application for the alloy will be for high-temperature steam turbine blades.

The alloy resulted from mixing it first on paper by putting into the theoretical recipe all the characteristics the Westinghouse scientists wanted. To kill the effects of mechanical vibration, for example, the scientists controlled the magnetic arrangement of the atoms, before the alloy was actually prepared.

The tuning forks shown on the front cover of this week's SCIENCE NEWS LETTER show that the predesigned magnetic structure minimizes vibration. The fork at the right is made of the new super-alloy, Nivco. (Continued on page 12.)

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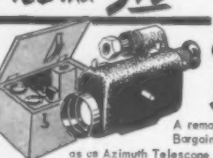
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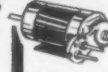
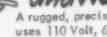
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"Now, after several years of research," Dr. Cochardt said, "we have discovered how to design needed mechanical behavior into certain alloys by control of their magnetic structure. This enables us to predict the behavior we will get by combining certain metals in different proportions, and we can do this without preparing and testing hundreds of thousands of potential combinations of two or more alloying metals.

Science News Letter, July 7, 1956

**MEDICINE****Low Protein Diets for Kidney Ills Questioned**

► IS THE current medical practice of keeping many kidney disease patients on a low protein diet advisable?

Perhaps not, it is suggested in research at the Long Beach Veterans Administration Center by Dr. Nathaniel B. Kurnick of the University of California Medical School, Los Angeles. The work is being supported by the American Cancer Society.

The findings apply particularly to patients whose kidneys are under-functioning and to those who have had one kidney removed. Dr. Kurnick has shown that when one kidney is removed, the other grows and increases its function to compensate for the loss of the organ.

Kidney growth took place not by cell multiplication but by cell enlargement. This was determined by measuring the amount of a nucleic acid, DNA, the substance genes are made of, in the tissue. The DNA remained constant during kidney growth, indicating that the cells did not multiply. But other measurements indicated that the cells were expanding to do more work.

Dr. Kurnick has found that while a low protein diet does spare kidney function it does not provide enough protein to promote expansion of kidney cells. He has shown in rats and in humans that a kidney functions best when the diet includes ample protein to provide for kidney growth but not so much protein that the kidney cannot excrete it all.

Science News Letter, July 7, 1956

**INVENTION****Typewriter Invention Replaces Morse Code Key**

► A WIRELESS operator can now type-write Morse code to other stations. A device that makes this possible has been invented by Leif Evensen of Larvik, Norway.

The invention is designed to replace the familiar Morse code telegraph-key with a standard typewriter keyboard. When a key on the typewriter is hit, an impulse is instantaneously converted to Morse code and transmitted by radio.

The Morse code typewriter can be used by anyone and is capable of transmitting up to 240 letters and figures per minute.

Science News Letter, July 7, 1956



# Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

**AVIATION FACTS AND FIGURES 1956**—Ben S. Lee, Ed.—*Aircraft Industries Association of America* (Lincoln Press), 103 p., illus., paper, \$1.00. Standard statistical reference book on the aircraft industry.

**CHAZYAN AND RELATED BRACHIOPODS**—G. Arthur Cooper—*Smithsonian Miscellaneous Collections*, Volume 127, Part I, Text, Part II, Plates, 1245 p., illus., \$2.00 for two-volume set. A natural sequel to the brachiopods of the Ozarkian and Canadian periods.

**CLINICAL STUDIES IN PSYCHIATRY**—Harry Stack Sullivan, edited by Helen Swick Perry, Mary Ladd Gawel and Martha Gibbon with a foreword by Dexter M. Bullard—*Norton*, 386 p., \$5.50. Based on lectures given by the late Dr. Sullivan and preserved on recordings.

**AN EVALUATION OF THE NEWER PSYCHOPHARMACOLOGICAL AGENTS AND THEIR ROLE IN CURRENT PSYCHIATRIC PRACTICE**—Franco Rinaldi and others—*American Psychiatric Association*, *Psychiatric Research Reports* 4, 129 p., illus., paper, \$2.00. Papers presented at a Regional Research Conference.

**A FIELD GUIDE TO THE FERNS: AND THEIR RELATED FAMILIES**—Boughton Cobb—*Houghton Mifflin*, *The Peterson Field Guide Series*, 281 p., illus., \$3.75. Spanning the interests of both beginner and expert. There are only a hundred or so ferns, so the amateur, if he makes the effort, can learn to know them all.

**FLOW OF GASES THROUGH POROUS MEDIA**—P. C. Carman—*Academic*, 182 p., illus., \$6.00. Approached from the viewpoint of the Kozeny theory.

**GENERAL CHEMISTRY**—John Alfred Timm—*McGraw-Hill*, 3d ed., 636 p., illus., \$6.00. An introductory text for both those who plan to take advanced courses and those who are taking chemistry as part of a liberal arts program.

**THE HERITAGE OF COMMUNITY: A Critique of Community Living Based on Great Ways of Life Practiced by Small Communities Over the World**—Arthur E. Morgan and Griscom Morgan, Eds.—*Community Service*, 64 p., paper, \$1.00. Descriptions of some ancient communities where a good life was developed.

**HUMAN OVULATION AND FERTILITY**—Edmond J. Farris—*Lippincott*, 159 p., illus., \$6.50. The information contained in this book has helped many childless couples to have a baby.

**HYDRODYNAMICS**—Hugh L. Dryden, Francis D. Murnaghan and H. Bateman—*Dover*, 634

p., paper, \$2.50. Offering a complete coverage of classical hydrodynamics. An extensive bibliography is included.

**INVESTIGATIONS ON THE THEORY OF THE BROWNIAN MOVEMENT**—Albert Einstein, edited with notes by R. Furth, translated by A. D. Cowper—*Dover*, 122 p., paper, \$1.25. Five papers gathered from rare German periodicals.

**IRISH MOSS: IN THE MARITIME PROVINCES**—Constance I. Macfarlane—*Nova Scotia Research Foundation*, 20 p., illus., paper, free upon request direct to publisher, P.O. Box 1027, Halifax, Nova Scotia, Canada. Written to assist those who may wish to identify this abundant seaweed, find it, and dry it for market.

**PLASTICS IN THE SERVICE OF MAN**—V. E. Yarsley and E. G. Couzens—*Penguin*, 315 p., illus., paper, 85 cents. Concentrating on what plastics do rather than how they do it.

**THE PRINCIPLES OF MECHANICS PRESENTED IN A NEW FORM**—Heinrich Hertz, preface by H. Von Helmholtz, authorized English translation by D. E. Jones and J. T. Walley with a new introduction by Robert S. Cohen—*Dover*, 274 p., paper \$1.75, cloth \$3.50. The last work of this 19th century physicist and mathematician.

**THE ROCK SHELTER OF LA COLOMBIERE: Archaeological and Geological Investigations of an Upper Perigordian Site Near Poncin (Ain)**—Hallam L. Movius, Jr. and Sheldon Judson with a report on the fauna by Henri Gauthier and a French Resume by Francois H. Bordes—*Peabody Museum, American School of Prehistoric Research Bulletin* No. 19, 176 p., illus., paper, \$4.85. The ancient hunters who took shelter in this cave had outstanding artistic ability.

**A TREATISE ON SURVEYING**—Reginald E. Middleton and Osbert Chadwick, W. Fisher Cassie, Ed.—*Philosophical Library*, 6th ed., Vol. I, 381 p., Vol. II, 438 p., illus., \$2.00 per set. A text for universities and engineering colleges.

Science News Letter, July 7, 1956

## MEDICINE

### Kidney Test Can Be Given in Doctor's Office

► A SAFE, rapid kidney-function test, with little or no discomfort, that can be given in a doctor's office was reported at the American Urological Association meeting in Boston.

The test, developed at the University of California at Los Angeles Medical Center, is performed in 10 to 15 minutes. It employs a radioactive iodine tagged material, Diodrast, scintillation counters and electronic equipment.

The test substance is injected intravenously. Scintillation counters placed over kidney areas measure radioactivity and thus indicate rates of uptake and excretion of test material.

Electronically recorded data, called renograms, accurately indicate each kidney's blood supply, function, and whether the upper urinary passages are open or ob-

structed by stones, tumors or infections. Certain kidney abnormalities have characteristic "renograms."

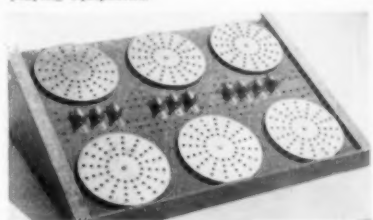
Present kidney tests involve time-consuming X-ray and special diagnostic surgical procedures to obtain urine specimens from each kidney.

The study was a cooperative effort among the U.C.L.A. Atomic Energy Project and Medical School and the Los Angeles Veterans Administration Center. The research team included Drs. G. V. Taplin, Chester Winter, O. M. Meredith and Harold Kade with the cooperation of Drs. Franz Bauer and William Goodwin.

Science News Letter, July 7, 1956

## Learn to Design COMPUTERS —With Our New Course—

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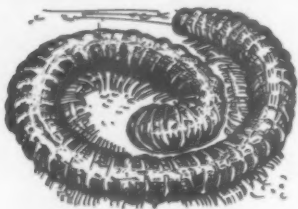
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Thousands of Legs

➤ HOW MANY legs does the "thousand-legs," shown in the illustration, have to carry him daintily over the floor? How many can his relative, the "hundred-legs," boast?

Both the millepedes (thousand-legs) and the centipedes (hundred-legs) belong to a class of animals appropriately called the "many-legged," for Myriapoda.

The sub-group of the Myriapoda in which the millepedes are found have two pairs of legs on every body segment except the first

four. Since some members of this sub-group have 60 or more body segments, then 56 times four legs per segment gives 224 separate legs at least for some of the millepedes. While not a thousand, this is legs aplenty.

The sub-group in which the centipedes are found have a single pair of legs for each body segment, and there is a range of from 15 to 177 body segments within the sub-group. Thus, 354 separate legs may be found on some of this sub-group.

An unknown poet, speculating on how these creatures keep from tripping over themselves, was inspired to the following verse:

A centipede was happy, quite,  
Until a toad in fun  
Said, "Pray, which leg moves after  
which?"

Which raised her doubts to such a pitch,  
She fell exhausted in the ditch,  
Not knowing how to run.

However, in nature the myriapods do not seem to run into the trouble of the philosophical centipede of this poem. In fact, in their own quiet way, they are quite successful animals. The millepedes, for instance, comprise some 900 genera—pointing to long and successful existence on earth for the group.

The myriapods, along with the insects, spiders and crustaceans are part of the large phylum of animals called the arthropods. This phylum is characterized by its members' bodies being divided into segments and by some or all of these body "compartments" bearing segmented limbs.

Using the presence of jointed limbs, worm-like myriapods or caterpillars can readily be distinguished from the true worms, such as earthworms. While these latter have segmented bodies, they never have the segmented limbs of the arthropods.

Science News Letter, July 7, 1956

#### ANTHROPOLOGY

## Cave Man's Tooth Troubles

➤ WHEN Stone Age man started living in caves and using tools instead of his teeth to capture and preserve food, human teeth began to deteriorate.

A survey of the microscopic quality of human teeth shows this, Dr. Reidar Sognnaes of Harvard School of Dental Medicine believes.

Dr. Sognnaes has examined teeth from Paleolithic Palestine, Prehistoric Greece, Predynastic Egypt, Ancient Iceland, Middle Age Norway and from Ancient Guatemala and Pecos Indian (New Mexico) sites.

The oldest tooth specimens, from the Stone Age period in Palestine, showed the formation of poor dentin and poor calcification. All Old World teeth show poor calcification and this seemed to result from disturbances occurring during the early years after birth. In the Pecos Indian teeth (1100-1700 A.D.) 50% had cavities. The Pecos Indian teeth were very prone to faulty microscopic structure.

"Stone Age teeth could be grouped with those of modern man with respect to the range and severity of developmental defects in the dental microstructure, probably due to inadequate or irregular diet," Dr. Sognnaes reports.

Defects in tooth development are exceedingly rare in such subhuman primates as the wild rhesus monkey, he notes.

This suggests this "the primates maintained uniformly perfect tooth structure only as long as they were basking in the sun of the treetops, depending for survival upon the perfection of their teeth; that the terrestrial apes (subhuman anthropoids as the wild chimpanzees, gorillas, gibbons and orangutangs) tended to have teeth of an intermediary microstructure, less perfect than the monkey but superior to early man; and that early man proved too clever

for his own good, dentally speaking, when he entered the cave and in the struggle for life discovered the use of other tools than his own teeth for the capture and preservation of food."

Dr. Sognnaes concludes, hopefully, that all may not be lost to man, dentally speaking. He suggests future generations may be able to prevent the severe microstructural defects in dental development by incorporating into the teeth the optimal chemical ingredients such as fluorine and other trace mineral factors in proper amount and ratio to each other.

Dr. Sognnaes reports his findings in the *American Journal of Pathology*.

Science News Letter, July 7, 1956

Can You . . .

## Spot the "Gimmick"?

There's fun in learning the art of magic—lots. But there's more than just fun. While learning the art entertains you and, later, your audience, it at the same time teaches you how people are fooled; where they are vulnerable and unsuspecting; how they tend to take things for granted and make snap—and wrong—judgments; how they are taken in by superficial "evidence"; lured into being off guard; or foolishly impulsive; and so on and on. Herein lie lessons of the greatest importance.

For the same principles learned from magic apply in our workaday world. The penalties for not seeing the "gimmick" in a magic trick are slight—being laughed at, perhaps—and it's all good fun. But in the outside world the penalties for not seeing the "gimmick" in a situation or in a proposition can be tragically heavy—and, contrariwise, the rewards for understanding what "gives" can be tremendous.

#### TEACH YOURSELF MAGIC

By J. Elsdon Tufts

Now comes TEACH YOURSELF MAGIC, a splendid course, in book form, in the art of conjuring, by a master magician—a "magician's magician." The instructions are detailed, yet simple—easy to understand and to follow. Lavish use of explanatory diagrams and illustrations help enormously to show exactly how to do card tricks, coin tricks, cigarette tricks, produce objects out of the air; make objects disappear; and perform a host of other "mystifying" feats.

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## Questions

**BOTANY**—Is it helpful to man for plants to take radiation from the air? p. 7.

☐ ☐ ☐

**GENERAL SCIENCE**—How are THINGS kits being adapted for use in Egypt? p. 6.

☐ ☐ ☐

**METALLURGY**—How can alloys be tailor-made? p. 11.

☐ ☐ ☐

**NUTRITION**—How are the world's eating habits changing? p. 4.

☐ ☐ ☐

**PHYSICS**—Why do Science Club members have a special memory of Nikola Tesla? p. 10.

☐ ☐ ☐

**PUBLIC HEALTH**—What danger is attached to X-ray treatment of the whole spine? p. 3.  
Where did a man die of bubonic plague? p. 5.

☐ ☐ ☐

Photographs: Cover, Westinghouse; p. 3, Rocket-dyne; p. 5, All American Engineering Co.; p. 7, Bausch & Lomb; p. 10, Kenneth Swazey; p. 16, G & H Industries.

## Kodak reports to laboratories on:

how to make alignment decisions that don't take so much out of a man... acrylic fiber and spectroscopic plates

### No knots

Take the Great Pyramid of Cheops at Gizeh. Take the Eiffel Tower. Take the *Nautilus*. Take one of those gigantic atom smashers. Take even a little thing like a million dollar turbine in a power generating station or a 70-foot planer bed. Always there comes a moment when the engineer-in-charge has to say, "OK, boys. She'll never be lined up any better than she is right now. Let's get on with the job." And the irrevocable next step is taken. Making a decision like that can take a lot out of a man.

Any gadget that puts such a decision on firmer ground ought to be worth quite a bit in peace of mind alone, to say nothing of the time cards of all those men standing around waiting, waiting for the word.

Right here we could make a big mistake by overplaying our hand. Let's better make plain where the new Kodak Axicon stands in relation to the art of aligning long axes.

The word "axicon" was coined by one of our chaps to designate

A telescope objective forms its image at a different little knot in space for each successive target along the line of sight. In following these images with the cross hairs, there is a chance for error of parallelism between the focusing motion and the axis. There is also doubt about how much of the observed displacement is real and how much of it is parallax because of inability to locate the knots exactly. With an axicon there is no focusing. Anywhere along a length of 40 feet—100 feet or more, if you like—the line of light is equally thin, forms an equally hard little point of light where intercepted.

*A procedure for aligning lower turbine shells with a Kodak Axicon Aligner has been worked out in full detail and even timed. The friends with whom we worked out this procedure certainly know the turbine trade as well as anybody alive. That they, with all their experience, like the axicon method encourages us to believe that the booklet prepared for their operating personnel might make interesting reading for others faced with awesome alignment problems. For a copy, write Eastman Kodak Company, Military and Special Products Sales, Rochester 4, N. Y.*

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We expect to sell quite a few million pounds of *Verel* staple at \$1.10 a pound (the delivered price east of

the Mississippi River). On Dr. Humason's order we should gross perhaps as much as \$27. It is hard to say which is more important, and that is no joke.

Remember that there is today no basic shortage of any type of fiber, natural or man-made, but a considerable shortage of objective information from which to spin theories about where the world came from and where it is going. Before Dr. Humason retires a few months from now, he expects to photograph spectra of the farthest galaxies within the grasp of the largest optical telescope that may ever be built. That "103a" emulsion is not as fast for ordinary or for high speed photography as the far better known *Kodak Tri-X Film*; its forte is the ability to respond in as little as 50 hours of exposure to the feeble trickle of billion-year-old photons.

Remember also one reason why gifted men can be allowed to draw good pay for time spent increasing the speed of Dr. Humason's plates. It is that many people who don't know a galaxy from a galvanometer (and couldn't care less) demand, when a fabric comes along that feels a little nicer because of proper moisture retention, wears a little better, holds shape and color a little better, that they have it on their backs *pronto*.

*Pilot plant quantities of Verel staple fiber are available for evaluation from Eastman Chemical Products, Inc., Kingsport, Tenn. (Subsidiary of Eastman Kodak Company). Plates that respond to light too dim for any eye are available from Kodak dealers after correspondence with Eastman Kodak Company, Professional Sensitized Goods Division, Rochester 4, N. Y.*

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this simple new class of axially symmetric optical elements, which, with the study of optics a couple of millenia old, he was lucky and smart enough to invent. An axicon images a point source of light along the axis as a straight line in space. No wire, however tight, can be so perfectly free of kink and sag. What of a telescope, you say?

**This is one of a series of reports on the many products and services with which the Eastman Kodak Company and its divisions are...serving laboratories everywhere**

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# New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE SERVICE, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 838. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

❁ **AUTOMOBILE TRAY** can be installed in any vehicle. Fitting under the dash, the unit has a tray, a drawer and a mirror and can substitute for an auto secretary, a quick-snack bar or a vanity case for M'lady.

Science News Letter, July 7, 1956

❁ **ALUMINUM CANVAS** for the amateur and professional artist is a sheet of chemically treated aluminum. This gives the metal a "tooth," a phrase used to describe a roughened surface which causes good adhesion of oil, paint or watercolor. A finished aluminum canvas will not chip, crack or peel.

Science News Letter, July 7, 1956

❁ **ELECTRIC DRUM HEATER** offers a simple, convenient way to heat paints, oils, greases, waxes or plastisols right in the drum. The heater is made to snap on any standard 5-gallon drum. The heater cord is then plugged into an outlet. Top temperature of the heater is 140 degrees Fahrenheit.

Science News Letter, July 7, 1956

❁ **CHERRY PITTER** can save the housewife time and trouble with cherry canning season coming up. Cherries are placed in a feeding trough, a crank is turned and out pop the cherries, neatly pitted, at the other



end. The device, shown in the photograph, will pit a quart of cherries in one minute.

Science News Letter, July 7, 1956

❁ **PUTTY TOOL** permits the homeowner to smooth, form angles and miter corners all

in one operation. Designed to replace the conventional putty knife, the tool is adjustable for use on any steel or wood window.

Science News Letter, July 7, 1956

❁ **CAN CONTAINER** solves unsanitary and unattractive problems created by garbage cans. The all-steel protective cabinet, made to hold the family-size garbage can, has a self-sealing lid and a hinged door for removing the can. Sand put in the base keeps it upright. The cabinet is 33 inches high and 21 inches wide.

Science News Letter, July 7, 1956

❁ **TINY DRAWER CASE** measures six and one-half inches square. Molded of high impact plastic, the storage cabinet has four transparent drawers, each of which can be divided into three separate compartments.

Science News Letter, July 7, 1956

❁ **NUMERICAL CARDS** are used in a new game that can be played and enjoyed by members of the family aged seven to seventy. Ten cards are dealt to each player and competition comes on completing or breaking the numerical sequence begun by two or four players. Ten racked up cards win. Game contains racks and numbered cards.

Science News Letter, July 7, 1956

An extra fillip for every week . . .

## SCIENCE NEWS LETTER for BIRTHDAYS ANNIVERSARIES

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7-7-6

## Do You Know?

Trout eggs hatch and the young fish grow best in water between 50 degrees and 60 degrees Fahrenheit.

The volume of international trade in meat last year reached its highest point ever, with beef showing the greatest rise.

Use of an electric fan to cool beef cattle in California's hot Imperial Valley boosted average daily gains of Hereford steers by about a pound.

A petrified tree stump, estimated to be 80,000,000 to 130,000,000 years old, was recently excavated near Fort Belvoir, Va.

The average wind velocity in the Los Angeles Basin is less than six miles per hour, and even this small breeze dwindles almost to nothing in the later part of the day.

A nest of acorns, uncovered in the heart of a California redwood tree by shingle mill workers, is believed by foresters to have been put there by a squirrel some time before Columbus discovered America.